Maine Farm Safety Program

Bulletin #2320

by Dawna L. Cyr, Farm Safety Project Assistant, and Steven B. Johnson, Ph.D., Area Crops Specialist

Welding Safety on the Farm

- **Personal Protective Equipment for Welding**

The employer must provide the proper personal protective equipment needed for welding jobs on the farm. Fire-resistant gauntlet gloves, aprons, coveralls, leggings and boots are the basics needed. Welding helmets, respirators, ultraviolet radiation filter plates for arc welding, and goggles with filter lenses are a must.

Maintain, store, inspect, clean and evaluate respirators routinely. Make sure everyone using them has been fit-tested. Workers doing overhead welding should be provided with fire-resistant shoulder covers, head covers and ear covers. When welding highly toxic materials, provide work uniforms, coveralls or full body coverings. There should be lockers or separate areas to store or change into street clothing. Collect all welding clothing, and launder it properly.

All protective clothing should be routinely inspected and maintained. Keep clothes free of grease and oil. Retreat fire-resistant clothing after laundering. Prohibit upturned sleeves and collars, because sparks or other materials may get caught in them. Button sleeves and collars.

Welding Safety on the Farm

- **Wear proper protective gear for welding.**
- **Thoroughly clean any container that contained a combustible substance before welding or cutting it.**
- **Maintain a fire extinguisher at the welding site.**
- **Ventilate the welding area.**
- **Keep tanks, valves and welding equipment in good condition.**
- **Keep flames, heat and sparks away from combustible materials.**
- **Avoid electric welders with defective jaws or poor insulation on the cables.**

University of Maine
Cooperative Extension

◆ Before Welding

Properly train all people welding. Do not allow anyone to use the equipment until they know the exact instructions on how to operate it. Do routine maintenance to keep equipment in working order. Ventilate the work area well. There must be sufficient movement of air to prevent toxic fumes from building up or oxygen from becoming deficient.

◆ Cutting Containers

Never weld or cut used drums, barrels, tanks or other containers unless they have been thoroughly cleaned of all substances that may produce flammable vapors or gases. Never use oxygen to ventilate a container, as it may start a fire or cause an explosion. As a final precaution after cleaning, a container should be vented and filled with water before welding or cutting begins. The container should be arranged so water can be kept filled to within a few inches of the point where the welding or cutting is to take place. Be sure there is a vent or opening to provide for release of air pressure or steam.

Whenever cutting, always keep a fire extinguisher nearby. Never use a cutting torch where sparks will be a hazard, such as near rooms containing flammable materials.

◆ Safety in Cutting

Whenever cutting, always keep a fire extinguisher nearby. Never use a cutting torch where sparks will be a hazard, such as near rooms containing flammable materials (especially dipping or spraying rooms). Take extra precaution in greasy, dirty, or gassy areas. If the cutting is to be over a wooden floor, sweep the floor clean and wet it down before starting the cutting. Provide a bucket containing water or sand to catch the dripping slag. Move combustible materials at least 40 feet away from any cutting or welding. If cutting is to be done near flammable materials and the flammable materials cannot be moved, use suitable fire-resistant guards, partitions or screens.

◆ Safety in Gas Welding

Under no circumstances should acetylene gas come in contact with unalloyed copper, except in a torch. Any contact of acetylene with high- alloyed copper piping will generate copper acetylide, which is very reactive and may result in a violent explosion. After assembling, all piping must be blown out with air or nitrogen to remove foreign materials.

Five Basic Rules for Safe Handling of Oxy-Acetylene Equipment

1. Keep oxy-acetylene equipment clean, free of oil, and in good condition.
2. Avoid oxygen and acetylene leaks.
3. Open cylinder valves slowly.
4. Purge oxygen and acetylene lines before lighting torch.
5. Keep heat, flame and sparks away from combustibles.

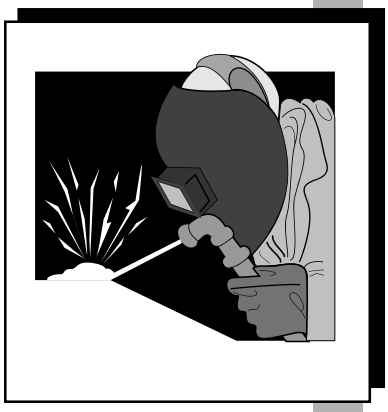
◆ Safety in Arc Welding

Arc welding includes shielded metal-arc, gas shielded and resistance welding. Only general safety measures can be shown for these areas because arc welding equipment varies considerably in size and type. Specific manufacturers' recommendations should be followed in each area.

Equip welding machines with power disconnect switches. Locate them at or near the machines so the power can be shut off quickly. Do not make repairs to welding equipment unless the power to the machine is disconnected. The high voltage used for arc welding machines can inflict severe and fatal injuries. Do not use welding machines without proper grounding. Stray current may develop, which can cause severe shock when ungrounded parts are touched. Do not ground to pipelines carrying gases or flammable liquids.

Do not use electrode holders with loose cable connections. Always keep connections tight. Avoid using electrode holders with defective jaws or poor insulation. Do not change the polarity switch when the machine is under a load. Wait until the machine idles and the circuit is open. Otherwise, the contact switch may be burned and the person throwing the switch may receive a severe burn from the arcing.

Do not operate the range switch under load. The range switch, which provides the current setting, should be operated only while the machine is idling and the current is open. Switching the current while the machine is under a load will cause an arc to form between the contact surfaces. Do not overload welding cables or operate a machine with poor connections. Operating with currents beyond the rated cable capacity causes overheating. Poor connections may cause the cable to arc when it touches metal grounded in the welding circuit.



Do not strike an arc if someone without proper eye protection is nearby. Arc rays are harmful to the eyes and skin. If other persons must work nearby, the welding area should be partitioned off with a fire-retardant canvas curtain to protect them from the arc welding flash. Never pick up pieces of recently welded or heated metal. Always wear protective eye goggles when chipping or grinding. A small particle of slag or metal may cause a severe eye injury.

◆ Steps to Prevent Electrical Shock

Electrical shock can be deadly. There are steps that can be taken to prevent electrical shock. Use well insulated electrode holders and cables. Keep clothing and gloves dry. Never change electrodes with bare hands, wet gloves or when standing on wet floors. If the ground is wet, use a dry board or rubber mat to stand on. Ground frames of welding units. Keep welding cables dry and free of grease and oil. Protect welding cables and leads. Keep welding cables away from power supply cables. Never loop the welding cable around the body.

◆ Air Contaminants

Welding generates fumes and gases. The amount and type of fumes and gases involved depends on the welding process, base material and filler material. The toxicity of the contaminants depends primarily upon concentrations. Provide adequate ventilation. Use exhaust hoods, air moving systems, and roof and wall exhaust fans. Also use natural ventilation.

This Maine Farm Safety Fact Sheet is part of an educational fact sheet series produced by the University of Maine Cooperative Extension. For more information on farm safety, contact your county Extension office.

Published and distributed in furtherance of Acts of Congress of May 8 and June 30, 1914, by the University of Maine Cooperative Extension, Vaughn H. Holyoke, Director for the University of Maine Cooperative Extension, the Land Grant University of the state of Maine and the U.S. Department of Agriculture cooperating. Cooperative Extension and other agencies of the U.S.D.A. provide equal opportunities in programs and employment. 7/95

Printed on recycled paper